The optimal time interval to increase radioiodine uptake in a multinodular goiter is 24 hours after recombinant human thyrotropin administration


The patients were randomly assigned to receive either a gluteal injection of 0.1 mg of rhTSH ($n = 60$) or an isotonic saline placebo ($n = 30$) given 24, 48, or 72 hours before the administration of a $^{131}$I tracer, after which an RAIU test was performed at 24 and 96 hours. Four weeks later, RAIU testing was repeated 24 and 96 hours after the administration of rhTSH. Before screening and enrollment, blood tests were obtained for serum thyroxine ($T_4$), triiodothyronine ($T_3$), calcitonin, and thyrotropin (TSH). The serum free $T_4$ index and $T_3$ index were calculated by multiplying the total $T_4$ values by the percentage of $T_3$ resin uptake. Thyroidal RAIU was determined 24 and 96 hours after the oral administration of 24 mCi (0.5 MBq) of $^{131}$I. Data were presented as frequencies and medians (range) or as means (±SD or ±SEM), depending on the normality of the data.

RESULTS
The study subjects were 90 patients, 78 women (87%) and 12 men (13%), with a median age of 52 years (range, 22 to 83). All patients completed the study. There were no statistically significant differences in age, sex, smoking status, goiter size, number of patients who had undergone hemithyroidectomy, serum TSH, and FT$_4$ index or baseline RAIU.

The absolute changes in mean 24-hour RAIU: RAIU did not change significantly from baseline in the placebo group. In the study group, the mean (±SD) RAIU increased from 33.8±2.3% to 66.0±1.8% within a 24-hour interval, from 36.8±2.1% to 64.6±2.7% within a 48-hour interval, and from 33.0±2.7% to 49±2.5% within a 72-hour interval (P<0.001 for all within-group changes) (Figure 1). The effect of rhTSH was negatively correlated with the initial RAIU ($r = –0.703$, P<0.001).

The relative increase in 24-hour and 96 hour RAIU: In the...
rhTSH-24-hour group, the mean (±SD) RAIU increased from 33.8±9.8% to 66.0±7.7% (mean relative increase, 111.2±15.5%) and the rhTSH-96-hour RAIU increased from 33.5±10.5% to 62.5±9.3% (mean [±SEM] relative increase, 102.±13.9% [SEM]). In the rhTSH-48-hour group, the mean 24-hour RAIU increased from 36.8±9.3% to 64.6±12% (mean relative increase, 83.3±11% and the rhTSH 96-hour RAIU increased from 37.5±9.8% to 63.7±13.6% (SEM) (mean [±SEM] relative increase, 74.9±8.7%). In the rhTSH-72-hour group, the mean 24-hour RAIU increased from 33.0±11.9 to 49.6±11.3% (mean relative RAIU increase 62.4±10.5%) and the 96-hour RAIU increased from 33.9±11% to 49.1±11.6% (mean [±SEM] relative increase, 55±10.3%; all changes in RAIU and rhTSH subgroups were significant (P<0.001) (Figure 2). There was a strong correlation between baseline 24-hour RAIU and the increase in 24-hour RAIU after rhTSH stimulation.

A post hoc analysis found that the mean relative increase in 24- and 96-hour RAIU in the rhTSH-24-hour group was significantly higher than the increase in the rhTSH-72-hour group (P = 0.023 and 0.012, respectively.

**CONCLUSION** In patients with MNG the optimal time interval to increase radioiodine uptake is 24 hours after rhTSH injection.

**REFERENCES**


